

Is the workplace becoming safer?

F. Curtis Breslin, Peter Smith, Mieke Koeboorn and Hyunmi Lee

Jobs in Canada are increasingly characterized by brain power rather than brawn. Despite the recent resurgence in some 'blue-collar' sectors (notably construction, oil and gas), the long-term shift has been away from resource and manufacturing industries to service-producing industries. Moreover, with an increasingly educated workforce, the structure and activities of many jobs are changing within sectors. Over the course of the 1990s, for example, the proportion of employees using computers on the job doubled from 30% to 60% (Marshall 2001). Have such changes resulted in fewer injuries on the job?

For more than a decade, compensation claims for lost work days have generally declined in North America and Europe. Over a six-year period in the 1990s, lost-time claim rates declined in Ontario by 28.8% (Mustard et al. 2003). Similar declines were seen elsewhere for claims related to specific conditions such as low-back pain and upper-extremity disorders (Silverstein et al. 1998; Murphy and Volinn 1999). Even though the declines are encouraging, the rate of decrease may not be uniform for all workers (Silverstein et al. 1998; Ostry 2000; Smith and Mustard 2004). For example, over a nine-year period, the proportion of women submitting claims for certain hand/wrist and elbow disorders more than doubled (Silverstein et al. 1998).

Workplace injuries among young workers aged 15 to 24 are of particular interest. Numerous U.S. and Canadian studies have shown youths to be at higher risk for work injuries than older workers. However, whether youths show a different relative risk for work injury between jurisdictions and how that risk changes over time has yet to be systematically examined. Initiatives such as media campaigns have been implemented in Canada and the U.S. to increase young workers' awareness of work safety (WorkSmartOntario 2006;

LOHP 1998). Differences in the scope and effectiveness of these initiatives may also lead to varying rates of decline for workers of different ages.

Although Canada may continue to become less reliant on jobs in the goods-producing sector, which has traditionally had higher injury rates, regional differences in economic structure and industry mean that dissimilar injury claim rates are likely to persist.

Using the Labour Force Survey to estimate the working population as well as work injury data from Ontario's Workplace Safety and Insurance Board and British Columbia's WorkSafeBC, this article examines injury claim rates to determine whether the two provinces show comparable claim trends over time; whether the injury risk differs by industry, sex or age; and whether injury rates changed between 1990 and 2001 (see *Data sources and definitions*).

Work injury claim rates generally declining

Overall, between 1990 and 2001, work injury rates declined in both British Columbia and Ontario (Chart). These findings are generally consistent with previous North American and European studies. In Ontario, the decline was 4.6% per year (from 5.2 to 2.5 per 100 full-time equivalents) and in British Columbia, 3.0% per year (from 6.1 to 4.1). The absolute decline was somewhat larger in the early 1990s than in the latter half of the decade, especially in Ontario. Possible reasons for the slowing in the rate of decline could be related to changes in occupational health and safety enforcement, a slowing of 'de-industrialization' (the movement away from the primary and manufacturing sectors to more service-oriented jobs), as well as changes in the process for determining insurance premiums (for example, experience rating programs) and improvements in technology and equipment. These, coupled with the reductions not being predominantly due to changes in claim reporting practices (Mustard et al. 2003), support the notion that an important reduction in injury risk has occurred in the two provinces.

The authors are with the Institute for Work and Health, Toronto, Ontario. Curtis Breslin can be reached at (416) 927-2027, ext 2225 or perspectives@statcan.ca.

Data sources and definitions

Ontario claims

Ontario's Workplace Safety and Insurance Board (WSIB) is the single payer workers' compensation insurance authority in Ontario and covers approximately 65% to 70% of labour force participants (AWCBC 2005). The remaining 30% to 35% include the self-employed, domestic workers, federal government workers,¹ the majority of the finance industry, and workers associated with interprovincial commerce. The WSIB requires lost-time claims to be submitted for any injury occurring during paid employment that results in an absence from regular work following the day of the accident, loss of wages/earnings, or a permanent disability/impairment.

Between 1990 and 2001, 1.5 million short-term and long-term disability claims were submitted to the WSIB. Records with no age, sex or industry were removed. Almost 33,000 claims (2%) were missing information on industry, and 270,000 (18%) were from industries with partial or complete voluntary coverage. These claims were removed since the workforce insured in these industries cannot be estimated. In addition, 11,000 claims (1%) had missing information on age or sex. This left a total of 1.2 million lost-time claims.

Each lost-time claim included injury date, sex, age at time of injury, and industry. The industry was coded to the Standard Industrial Classification 1980 (Statistics Canada 1986). Workplaces were grouped into two categories: goods and services. Goods-producing industries comprised agriculture, fishing, forestry, mining and oil, manufacturing, and construction. Service industries comprised transportation; communication; trade; finance and insurance; real estate; business services; government services; education; health and social services; and accommodation, food and beverages.

British Columbia claims

WorkSafeBC insures approximately 90% of workers in British Columbia. The remaining 10% include certain government employees (AWCBC 2005). WorkSafeBC defines a lost-time claim as an injury that "disables a worker from earning full wages at the work at which the worker was employed." (Section 5(2) of the British Columbia Workers' Compensation Act). It goes on to say that compensation is payable from the first working day following the day of the injury, while a health-care benefit only is payable for day of the injury.

Between 1990 and 2001, 908,000 short-term and long-term lost-time claims were reported to WorkSafeBC. Of these, 4,000 (0.5%) had industry code problems. An additional 22,000 (2.4%) were missing information on age or sex, leaving almost 900,000 lost-time claims. Although the coding system used is based on the Standard Industrial Classification System 1980 (SIC80), it has been modified to include specific industry groups that are more prevalent in B.C. (e.g., classification unit 703016 – *tree planting or cone picking* is not specifically included in the SIC80, but rather is under 0511 – *other forestry services*). However, these additions did not affect the allocation of each claim under the broad category of goods or services. A full description of the allocation procedures used is available from the authors.

Denominators

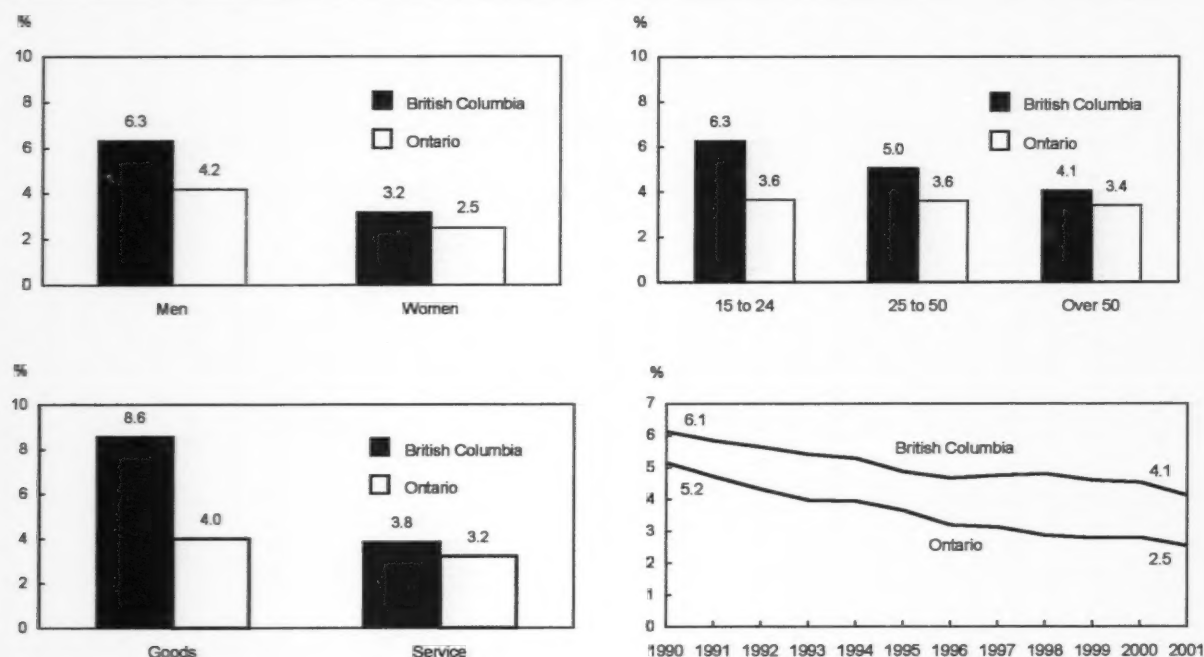
Denominators for lost-time claims were estimated using Statistics Canada's **Labour Force Survey** (LFS). The LFS is a monthly survey that uses a rotating panel design (respondents remain in the panel for six months) to estimate month-to-month changes in Canadian labour force participation among the civilian, non-institutionalized population aged 15 and older. The survey collects information on both employment status and hours worked.

Federal government employees and the self-employed were not included in the denominator for either Ontario or British Columbia. Denominator estimates for Ontario were further adjusted to represent differing insurance coverage across industry groups. Methods for this adjustment have been more extensively described elsewhere (Smith, Mustard and Payne 2004).

Given the notable difference in missing industry codes between Ontario and British Columbia (2% versus 0.2% of claims), a sensitivity analysis was performed to determine whether adding these claims (which did contain information on age and sex) would substantially alter claim rates. That is, it was assumed that all claims missing industry data in Ontario were from workplaces with mandatory coverage. Including these in the calculation of age-sex rates did not substantively alter any of the conclusions in this paper.

Unadjusted rates of lost-time claims per 100 full-time equivalents (FTEs) per year were calculated by each age, sex, and industry combination. A **full-time equivalent** employee was estimated to represent 2,000 hours worked per year. Adjusted claim rates were calculated using direct standardization methods (Hennekens and Buring 1987). This method corrects crude injury rates to account for, in the case of this analysis, differences between Ontario and British Columbia in industry, age, and male-female composition of the labour force. That is, the rate of injury for male labour force participants, as presented in Table 2, is the rate expected if male workers in Ontario and British Columbia had identical participation rates across industry and age groups. A similar procedure was used to calculate adjusted claim rates across age and industry groups. The percentage change in adjusted lost-time claim rates per 100 FTEs was calculated between 1990 and 2001 and compared between provinces.

The claim rates calculated with LFS denominators tended to be higher than those reported by the respective compensation boards. For example, in 2001, the overall claim rate for British Columbia was reported as 3.6 per 100 workers whereas using LFS data as the denominator led to a rate of 4.1 per 100 FTEs (AWCBC 2005). The Association of Workers' Compensation Boards of Canada report also shows the 2001 Ontario claim rate of 2.4 per 100 workers while the LFS method led to a rate of 2.5 per 100 FTEs. This pattern suggests that LFS denominators, adjusted to directly estimate the hours contributed by part-time and full-time workers, provide a smaller estimate of the provincial workforce than the payroll method of calculating denominators.

Chart Lost-time claims per 100 full-time equivalent employees, 1990 to 2001

Sources: Workplace Safety and Insurance Board (Ontario); WorkSafeBC; Statistics Canada, Labour Force Survey

Variation between Ontario and British Columbia in overall work injury trends may be partly explained by differences in patterns of economic change. For example, British Columbia, which had higher initial rates and smaller subsequent declines, continues to have a large primary industry employment base (agriculture, fisheries, forestry, mining). Compared with Ontario, B.C. may have experienced less of a shift away from these higher risk industries toward the relatively safer service and retail sectors (Ostry 2000). This pattern does not appear to be the entire story, however, because even within sectors, declines varied. Most notably, the service industry in British Columbia showed a reduction in claim rates that was less than Ontario's. The extent to which these provincial variations represent differences in hazard exposure or safety improvement warrants further investigation.

Injury claim rates lower for women and older workers

While injury claim rates were lower for women than for men in both British Columbia and Ontario, the difference was more pronounced in British Columbia (Table). For example, in 2001, the adjusted claim rate for men in B.C. was 5.4 per 100 full-time equivalents and only 3.0 for women. This compares with 2.8 and 2.0 in Ontario. Interestingly, the men's claim rate in B.C. was almost double Ontario's, even after being adjusted for industry and age. Additionally, although claim rates decreased for both men and women in the two provinces between 1990 and 2001, the reduction was more pronounced in Ontario—more than 50% for men and about 40% for women. In British Columbia, the comparable figures were 38% and 10%, suggesting that factors other than changing industry and age composition play a role in injury claim rates.

Table Adjusted lost-time claims per 100 full-time equivalent employees

	1990 ¹	2001 ¹	Change
Age group		%	
British Columbia			
15 to 24	9.6	6.7	-30.0
25 to 50	7.2	4.8	-34.1
Over 50	5.5	3.7	-33.5
Ontario			
15 to 24	5.5	3.0	-45.4
25 to 50	5.2	2.5	-51.7
Over 50	4.7	2.3	-50.9
Sex			
British Columbia			
Men	8.8	5.4	-38.3
Women	3.3	3.0	-9.9
Ontario			
Men	6.1	2.8	-53.4
Women	3.3	2.0	-40.6
Industry			
British Columbia			
Goods	9.9	6.0	-39.7
Service	4.5	3.6	-19.8
Ontario			
Goods	5.9	2.7	-53.9
Service	4.5	2.4	-47.3

¹ Claim rate adjusted for all other variables included in the table.
 Sources: Workplace Safety and Insurance Board (Ontario);
 WorkSafeBC; Statistics Canada, Labour Force Survey,
 1990 to 2001

Of particular interest are young workers, who historically have had a higher risk of workplace injuries. Several factors may account for this. First, they are relatively inexperienced (Breslin and Smith 2006). Secondly, they are often concentrated in the service and retail industry (NRC/IM 1998), so de-industrialization may not cause their work injury rates to fall to the same degree as for adult workers (Loomis et al. 2004). Finally, they are often in precarious jobs (part-time, temporary or contract work) and may not receive work-safety training, which is often targeted to full-time employees (Quinlan, Mayhew and Bohle 2001). Injury prevention initiatives have been implemented in Canada and the United States to increase young workers' awareness of work safety and hopefully reduce their injury rates.

In both British Columbia and Ontario, injury rates were highest for young workers aged 15 to 24 in 1990. As with overall injury rates, injury rates for these workers were higher in B.C. than in Ontario. In B.C., for every 100 full-time equivalents aged 15 to 24, almost 10 had experienced some type of workplace injury, while the corresponding figure in Ontario was slightly less than 6.

Injury rates for young workers fell significantly between 1990 and 2001—by 30% in B.C. and more than 45% in Ontario. However, the decrease was smaller than for any other age group and their rates remained the highest, indicating that the focus on injury prevention among young workers continues to be important.

Older workers still had the lowest injury rates per 100 full-time equivalents. In 2001, the rate was 3.7 per 100 in British Columbia and 2.3 in Ontario, even after adjusting for differences in industry, age, and male-female composition of the workforce.

Claim rates lower in the service industry

Industries were broken down into goods-producing and service-producing. Goods-producing industries were agriculture, fishing, forestry, mining and oil, manufacturing, and construction. Service industries were transportation; communication; trade; finance and insurance; real estate; business services; government services; education; health and social services; and accommodation, food and beverages.

Not surprisingly, the service sector had lower injury rates than the goods sector in both provinces in 1990 and 2001, with B.C.'s rates continuing to be slightly higher than Ontario's in each category. Again, although injury rates decreased in both provinces over the period for both goods- and service-producing industries, declines were much more pronounced in Ontario, even after controlling for age and sex. One explanation may have to do with industry mix. For example, the composition of goods-producing industries within each province is significantly different, with employment in British Columbia more concentrated in 'riskier' sectors such as forestry and mining, while Ontario's is centered around manufacturing industries, which have seen many technological improvements.

Traditionally, injury rates have been higher in the goods sector than in services. This holds in both provinces, although substantial declines in injury rates have been

seen, suggesting improved safety measures (Conway and Svenson 1998). However, the adjusted claim rate in B.C. in 2001 for the service sector was 3.6 per 100, while in Ontario the goods-producing industry was lower at 2.7. As well as being a result of differences in industry composition within the goods and service sectors, differences between the provinces may be, in part, a result of different claim reporting practices by employers and compensation boards.

Finally, these overall declines could partly be due to the different nature of injuries in goods and services. Compensation systems may not be as sensitive at picking up chronic injuries, common to service-type work, compared with acute injuries, associated more with resources and manufacturing.

Summary

Overall, work injury claim rates declined in both Ontario and British Columbia between 1990 and 2001. However, declines were not uniform by province, industry, or demographic group.

Although men's injury rates declined more than women's, women still had lower overall rates in both provinces. Additionally, the youngest age group, which had the highest initial claim rates, had larger absolute declines than the oldest age group. However, the percentage decline for young workers was the lowest of all age groups.

Injury rates declined in both goods and service industries in both provinces. The decline was much more pronounced in Ontario and may be partly a result of greater de-industrialization in the Ontario economy—that is, a move away from goods-producing industries toward services.

The general decline in the overall claim rates of both provinces is encouraging. Nevertheless, differences in trends and relative risks among worker subgroups in the two provinces serve to draw attention to opportunities to reduce the injury risks workers encounter.

This study was supported by a grant from the Workplace Safety and Insurance Board, Research Advisory Council, # 02-007.

Perspectives

Note

1 Federal government employees in Ontario are indirectly covered by the WSIB. Claims are assessed by the WSIB, but compensation is paid by the federal government.

References

- Association of Workers' Compensation Boards of Canada (AWCBC). 2005. *2001 Key Statistical Measures*. Mississauga, Ont.: AWCBC. http://www.awcbc.org/english/board_data-key.asp.
- Breslin, F. Curtis and Peter M. Smith. 2006. "Trial by fire: A multivariate examination of the relationship between job tenure and work injuries." *Occupational and Environmental Medicine* 63, no. 1 (January): 27-32.
- Conway, Hugh, and Jens Svenson. 1998. "Occupational injury and illness rates, 1992-96: Why they fell." *Monthly Labor Review* 121, no. 11 (November): 36-58.
- Hennekens, Charles H. and Julie E. Buring. 1987. *Epidemiology in medicine*. Philadelphia: Lippincott, Williams and Wilkins.
- Labor Occupational Health Program (LOHP). 1998. *Teens, Work, and Safety: A Curriculum for High School Students*. Center for Occupational and Environmental Health. Berkeley: University of California.
- Loomis, D., D.B. Richardson, J.F. Bena and A.J. Bailer. 2004. "Deindustrialisation and the long term decline in fatal occupational injuries." *Occupational and Environmental Medicine* 61, no. 7 (July): 616-621.
- Marshall, Katherine. 2001. "Working with computers." *Perspectives on Labour and Income* (Statistics Canada Catalogue 75-001-XIE). May 2001 online edition.
- Murphy, Patrice L. and Ernest Volinn. 1999. "Is occupational low back pain on the rise?" *Spine* 24, no. 7: 691-697. April 1.
- Mustard, Cameron A., Donald Cole, Harry Shannon, Jason Pole, Terry Sullivan and Richard Allingham. 2003. "Declining trends in work-related morbidity and disability, 1993-1998: A comparison of survey estimates and compensation insurance claims." *American Journal of Public Health* 93, no. 8 (August): 1283-1286.
- National Research Council and the Institute of Medicine (NRC/IM). Committee on the Health and Safety Implications of Child Labor. 1998. *Protecting Youth at Work: Health, Safety, and Development of Working Children and Adolescents in the United States*. Washington, D.C.: National Academy Press.

Ostry, Aleck. 2000. "From chainsaws to keyboards: Injury and industrial disease in British Columbia." In *Injury and the New World of Work* edited by Terrence Sullivan. p. 27-45. Vancouver: UBC Press.

Quinlan, Michael, Claire Mayhew and Philip Bohle. 2001. "The global expansion of precarious employment, work disorganization, and consequences for occupational health: A review of recent research." *International Journal of Health Services* 31, no. 2: 335-414.

Silverstein, B., E. Welp, N. Nelson and J. Kalat. 1998. "Claims incidence of work-related disorders of the upper extremities: Washington state, 1987 through 1995." *American Journal of Public Health* 88, no. 12 (December): 1827-1833.

Smith, Peter M. and Cameron A. Mustard. 2004. "Examining the associations between physical work demands and work injury rates between men and women in Ontario, 1990-2000." *Occupational and Environmental Medicine* 61: 750-756.

Smith, Peter M., Cameron A. Mustard and Jennifer I. Payne. 2004. "Methods for estimating the labour force insured by the Ontario Workplace Safety and Insurance Board: 1990-2000." *Chronic Diseases in Canada* 25, no. 3/4 (Summer/Fall): 127-137. (Public Health Agency of Canada)

Statistics Canada. 1986. *Canadian Standard Industrial Classification for Companies and Enterprises, 1980*. Catalogue no. 12-570-XPE. Ottawa.

WorkSmartOntario. 2006. *Ontario Young Worker Health and Safety Initiatives/Programs Inventory*. Toronto: Ontario Ministry of Labour. Contact: sue.boychuk@mol.gov.on.ca.